

SEQUENCE LISTING

<110> Booth, Russ
Cahoon, Rebecca E
Hitz, William D
Kinney, Anthony
Yadav, Naren

<120> Nucleotide Sequences of a New Class of Diverged Delta-9 Stearoyl-ACP Desaturase

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<151> 2000-08-22

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<212> DNA
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<212> PRT
<213> Glycine max

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35 40 45

Leu Pro Pro Leu Asn Ala Ala Val Ser Ala Ala Pro Phe Lys Ala Arg
50 55 60

Lys Ala His Ser Met Pro Pro Glu Lys Lys Glu Ile Phe Lys Ser Leu
65 70 75 80

Glu Gly Trp Ala Ser Glu Trp Val Leu Pro Leu Leu Lys Pro Val Glu
85 90 95

Gln Cys Trp Gln Pro Gln Asn Phe Leu Pro Asp Pro Ser Leu Pro His
100 105 110

Glu Glu Phe Ser His Gln Val Lys Glu Leu Arg Glu Arg Thr Lys Glu
115 120 125

Leu Pro Asp Glu Tyr Phe Val Val Leu Val Gly Asp Met Val Thr Glu
130 135 140

Asp Ala Leu Pro Thr Tyr Gln Thr Met Ile Asn Asn Leu Asp Gly Val
145 150 155 160

Lys Asp Asp Ser Gly Thr Ser Pro Ser Pro Trp Ala Val Trp Thr Arg
165 170 175

Ala Trp Thr Ala Glu Glu Asn Arg His Gly Asp Leu Leu Arg Thr Tyr
180 185 190

Leu Tyr Leu Ser Gly Arg Val Asp Met Ala Lys Val Glu Lys Thr Val
195 200 205

His Tyr Leu Ile Ser Ala Gly Met Asp Pro Gly Thr Asp Asn Asn Pro
210 215 220

Tyr Leu Gly Phe Val Tyr Thr Ser Phe Gln Glu Arg Ala Thr Phe Val
225 230 235 240

Ala His Gly Asn Thr Ala Arg Leu Ala Lys Glu Gly Gly Asp Pro Val
245 250 255

Leu Ala Arg Leu Cys Gly Thr Ile Ala Ala Asp Glu Lys Arg His Glu
260 265 270

Asn Ala Tyr Ser Arg Ile Val Glu Lys Leu Leu Glu Val Asp Pro Thr
275 280 285

Gly Ala Met Val Ala Ile Gly Asn Met Met Glu Lys Lys Ile Thr Met
290 295 300

Pro Ala His Leu Met Tyr Asp Gly Asp Asp Pro Arg Leu Phe Glu His
305 310 315 320

Tyr Ser Ala Val Ala Gln Arg Ile Gly Val Tyr Thr Ala Asn Asp Tyr
325 330 335

Ala Asp Ile Leu Glu Phe Leu Val Glu Arg Trp Arg Leu Glu Lys Leu
340 345 350

Glu Gly Leu Met Ala Glu Gly Lys Arg Ala Gln Asp Phe Val Cys Gly
355 360 365

Leu Ala Pro Arg Ile Arg Arg Leu Gln Glu Arg Ala Asp Glu Arg Ala
370 375 380

Arg Lys Met Lys Lys His His Gly Val Lys Phe Ser Trp Ile Phe Asn
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Lys Glu Leu Leu Leu
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<212> DNA
<213> Zea mays

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<212> PRT
<213> Zea mays

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<222> (75)

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Ser Ser Ala Arg Thr Arg Val Thr Leu Pro Gln Ile Ile His Trp Arg
35 40 45

Cys Arg Ser Ser His Ser Ser Thr Gly Thr Thr Thr Met ala Val Pro
50 55 60

Val Leu Lys Arg Arg Glu Lys Gln Asp Glu Xaa Gln Glu Trp Met Gly
65 70 75 80

Tyr Leu Ala Pro Glu Lys Leu Glu Val Leu Ala His Leu Glu Pro Trp
85 90 95

Ala Glu Ala His Val Leu Pro Leu Leu Lys Pro Ala Glu Glu
100 105 110

<210> 5
<211> 880
<212> DNA
<213> Zea mays

<400> 5

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gcatcgccat ccgcgcgcgc gggccgggtgg cggcgcacgca ggccccccgc cgccgacggc 180
aatgcccgt gtctgcggcg gcggtcggcg cggccgcgc ggcgcgcgc gtgacgcact 240
cgatgcccgc ggagaaggcg gaggtgttcc gtcgtggca gggctggcg ggcgcgtcgc 300

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cctcgccga	gatgttccgg	cacgaggtcc	gcgagctgcg	cgcggcgcc	gcggggctcc	420
ccgacgagta	cttcgtcg	ctcggtggcg	acatggtcac	ggaagaggcg	ctgccccacgt	480
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<212> PRT
<213> Zea mays

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Thr Gln Ala Pro Ala Arg Arg Arg Gln Cys Arg Val Ser Ala Ala Ala
20 25 30

Val Gly Ala Pro Ala Ala Arg Ala Arg Val Thr His Ser Met Pro Pro
35 40 45

Glu Lys Ala Glu Val Phe Arg Ser Leu Glu Gly Trp Ala Ala Arg Ser
50 55 60

Leu Leu Pro Leu Leu Lys Pro Val Glu Glu Cys Trp Gln Pro Ala Asp
65 70 75 80

Phe Leu Pro Asp Ser Ser Ser Glu Met Phe Gly His Glu Val Arg Glu
 85 90 95

Leu Arg Ala Arg Ala Ala Gly Leu Pro Asp Glu Tyr Phe Val Val Leu
100 105 110

Val Gly Asp Met Val Thr Glu Glu Ala Leu Pro Thr Tyr Gln Thr Met
115 120 125

Ile Asn Thr Leu Asp Gly Val Arg Asp Glu Thr Gly Ala Ser Asn Cys
130 135 140

Pro Trp Ala Val Trp Thr Arg Ala Trp Thr Ala Glu Glu Asn Arg His
145 150 155 160

Gly Asp Ile Leu Gly Lys Tyr Met Tyr Leu Ser Gly Arg Val Asp Met
165 170 175

Arg Met Val Glu Lys Thr Val Gln Tyr Leu Ile Gly Ser Gly Met Asp
180 185 190

Pro Gly Thr Glu Asn Asn Pro Tyr Leu Gly Phe Val Tyr Thr Ser Phe
195 200 205

Gln Glu Arg Ala Thr Ala Val Ser His Gly Asn Thr Ala Arg Leu Pro
210 215 220

Arg Ala His Gly Asp Asp Phe Leu Ala Arg Ala Cys Gly Thr Asn Arg
225 230 235 240

Arg Gln Gln Glu Thr Lys Gln Asn Gly Leu Arg Gly Ile Leu Gln Glu
245 250 255

Val
257

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<212> DNA
<213> Oryza sativa

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<210> 8
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 <212> PRT
 <213> Oryza sativa

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Arg Leu Ile Arg Ser Gly Met ala Val Asp Pro Pro Cys Ser Pro Tyr
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His Ala Phe Val Tyr Thr Ala Phe Gln Glu Arg Ala Thr Ala Val Ala
 35 40 45

His Gly Asn Thr Ala Arg Leu Val Gly Ala Arg Gly His Gly Asp Ala
 50 55 60

Ala Leu Ala Arg Val Cys Gly Thr Val Ala Ala Asp Glu Lys Arg His
 65 70 75 80

Glu Ala Ala Tyr Thr Arg Ile Val Ser Arg Leu Leu Glu Ala Asp Pro
 85 90 95

Asp Ala Gly Val Arg Ala Val Ala Arg Met Leu Arg Arg Gly Val
 100 105 110

<210> 9
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 <212> DNA
 <213> Zea mays

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<211> 424
<212> PRT
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<400> 10
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Tyr Lys Pro Ala Asn Ala Lys Asp Ser Tyr Tyr Cys Phe Lys Phe Ala
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Ser Ser Ala Arg Thr Arg Val Thr Leu Pro Gln Ile Ile His Trp Arg
35 40 45

Cys Arg Ser Ser His Ser Ser Thr Gly Thr Thr Met Ala Val Pro
50 55 60

Val Leu Lys Arg Arg Glu Lys Gln Asp Glu Glu Gln Glu Trp Met Gly
65 70 75 80

Tyr Leu Ala Pro Glu Lys Leu Glu Val Leu Ala His Leu Glu Pro Trp
85 90 95

Ala Glu Ala His Val Leu Pro Leu Leu Lys Pro Ala Glu Glu Ala Trp
100 105 110

Gln Pro Ser Asp Met Leu Pro Asp Pro Ala Ala Leu Gly Asp Glu Gly
115 120 125

Phe His Asp Ala Cys Arg Glu Leu Arg Ala Arg Ala Ala Ser Val Pro
130 135 140

Asp Ala His Leu Val Cys Leu Val Gly Asn Met Ile Thr Glu Glu Ala
145 150 155 160

Leu Pro Thr Tyr Gln Ser Val Pro Asn Arg Phe Glu Ala Val Arg Asp
165 170 175

Leu Thr Gly Ala Asp Ser Thr Ala Trp Ala Arg Trp Ile Arg Gly Trp
180 185 190

Ser Ala Glu Glu Asn Arg His Gly Asp Ala Leu Ser His Tyr Met Tyr
195 200 205

Leu Ser Gly Arg Val Asp Met Arg Gln Val Asp Arg Thr Val His Arg
210 215 220

Leu Ile Ala Ser Gly Met Ala Met Asn Ala Ala Arg Ser Pro Tyr His
225 230 235 240

Gly Phe Ile Tyr Val Ala Phe Gln Glu Arg Ala Thr Ala Ile Ser His
245 250 255

Gly Asn Met Ala Arg His Val Gly Ala His Gly Asp His Val Leu Ala
260 265 270

Arg Val Cys Gly Ala Ile Met Ala Asp Glu Lys Arg His Glu Thr Ala
275 280 285

Tyr Thr Arg Ile Val Ala Lys Leu Phe Glu Val Asp Pro Asp Ala Ala
290 295 300

Val Arg Ala Leu Gly Tyr Met Met Arg His Arg Ile Thr Met Pro Ala
305 310 315 320

Ala Leu Met Thr Asp Gly Arg Asp Ala His Leu Tyr Ala His Tyr Ala
325 330 335

Ala Ala Ala Gln Gln Thr Gly Val Tyr Thr Ala Ser Asp Tyr Arg Ser
340 345 350

Ile Leu Glu His Leu Ile Arg Gln Trp Arg Val Glu Glu Leu Ala Ala
355 360 365

Gly Leu Ser Gly Glu Gly Arg Arg Ala Arg Asp Tyr Val Cys Gly Leu
370 375 380

Pro His Lys Ile Arg Arg Met Glu Glu Lys Ala His Asp Arg Ala Ala
385 390 395 400

Gln Thr Gln Lys Lys Pro Thr Ser Val Pro Phe Ser Trp Ile Phe Asp
405 410 415

Arg Ser Val Asn Val Val Ile Pro
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<212> DNA

<213> Zea mays

<400> 11

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<210> 12
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<212> PRT
<213> Zea mays

<400> 12
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Thr Gln Ala Pro Ala Arg Arg Arg Gln Cys Arg Val Ser Ala Ala Ala
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Val Gly Ala Pro Ala Ala Arg Ala Arg Val Thr His Ser Met Pro Pro
35 40 45

Glu Lys Ala Glu Val Phe Arg Ser Leu Glu Gly Trp Ala Ala Arg Ser
50 55 60

Leu Leu Pro Leu Leu Lys Pro Val Glu Glu Cys Trp Gln Pro Ala Asp
65 70 75 80

Phe Leu Pro Asp Ser Ser Ser Glu Met Phe Gly His Glu Val Arg Glu
85 90 95

Leu Arg Ala Arg Ala Ala Gly Leu Pro Asp Glu Tyr Phe Val Val Leu
100 105 110

Val Gly Asp Met Val Thr Glu Glu Ala Leu Pro Thr Tyr Gln Thr Met
115 120 125

Ile Asn Thr Leu Asp Gly Val Arg Asp Glu Thr Gly Ala Ser Asn Cys
130 135 140

Pro Trp Ala Val Trp Thr Arg Ala Trp Thr Ala Glu Glu Asn Arg His
145 150 155 160

Gly Asp Ile Leu Gly Lys Tyr Met Tyr Leu Ser Gly Arg Val Asp Met
165 170 175

Arg Met Val Glu Lys Thr Val Gln Tyr Leu Ile Gly Ser Gly Met Asp
180 185 190

Pro Gly Thr Glu Asn Asn Pro Tyr Leu Gly Phe Val Tyr Thr Ser Phe
195 200 205

Gln Glu Arg Ala Thr Ala Val Ser His Gly Asn Thr Ala Arg Leu Ala
210 215 220

Arg Ala His Gly Asp Asp Val Leu Ala Arg Ala Cys Gly Thr Ile Ala
225 230 235 240

Ala Asp Glu Lys Arg His Glu Thr Ala Tyr Gly Arg Ile Val Glu Gln
245 250 255

Leu Leu Gln Leu Asp Pro Glu Gly Ala Val Leu Ala Val Ala Asp Met
260 265 270

Met Arg Lys Arg Ile Thr Met Pro Ala His Leu Met His Asp Gly Arg
275 280 285

Asp Met Asp Leu Phe Glu His Phe Ala Ala Val Ala Gln Arg Leu Gly
290 295 300

Val Tyr Thr Ala Arg Asp Tyr Ala Asp Ile Val Glu Phe Leu Val Lys
305 310 315 320

Arg Trp Lys Leu Glu Thr Leu Glu Ser Gly Leu Ser Gly Glu Gly Arg
325 330 335

Arg Ala Arg Asp Phe Val Cys Gly Leu Ala Pro Arg Met Arg Arg Ala
340 345 350

Ala Glu Arg Ala Glu Asp Arg Ala Lys Lys Asp Glu Pro Arg Met Val
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Lys Phe Ser Trp Ile Phe Asp Arg Glu Ala Val Val
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<210> 13

<211> 773

<212> DNA

<213> Oryza sativa

<400> 13

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<212> PRT

<213> Oryza sativa

<400> 14

Tyr Leu Ser Gly Arg Phe Asp Met Ala Glu Val Glu Arg Ala Val His
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Arg Leu Ile Arg Ser Gly Met Ala Val Asp Pro Pro Cys Ser Pro Tyr
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His Ala Phe Val Tyr Thr Ala Phe Gln Glu Arg Ala Thr Ala Val Ala
35 40 45

His	Gly	Asn	Thr	Ala	Arg	Leu	Val	Gly	Ala	Arg	Gly	His	Gly	Asp	Ala
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Ala	Leu	Ala	Arg	Val	Cys	Gly	Thr	Val	Ala	Ala	Asp	Glu	Lys	Arg	His
65				70				75			80				
Glu	Ala	Ala	Tyr	Thr	Arg	Ile	Val	Ser	Arg	Leu	Leu	Glu	Ala	Asp	Pro
				85				90				95			
Asp	Ala	Gly	Val	Arg	Ala	Val	Ala	Arg	Met	Leu	Arg	Arg	Gly	Val	Ala
				100				105			110				
Met	Pro	Thr	Ser	Pro	Ile	Ser	Asp	Gly	Arg	Arg	Asp	Asp	Leu	Tyr	Ala
				115			120			125					
Cys	Val	Val	Ser	Leu	Ala	Glu	Gln	Ala	Gly	Thr	Tyr	Thr	Val	Ser	Asp
				130		135			140						
Tyr	Cys	Ser	Ile	Val	Glu	His	Leu	Val	Arg	Glu	Trp	Arg	Val	Glu	Glu
	145			150			155			160					
Leu	Ala	Ala	Gly	Leu	Ser	Gly	Glu	Gly	Arg	Arg	Ala	Arg	Asp	Tyr	Val
				165			170			175					
Cys	Glu	Leu	Pro	Gln	Lys	Ile	Arg	Arg	Met	Lys	Glu	Lys	Ala	His	Glu
				180			185			190					
Arg	Ala	Val	Lys	Ala	Gln	Lys	Lys	Pro	Ile	Ser	Ile	Pro	Ile	Asn	Trp
				195		200			205						
Ile	Phe	Asp	Arg	His	Val	Ser	Val	Met	Leu	Pro					
				210		215									

<210> 15
 <211> 1318
 <212> DNA
 <213> Oryza sativa

<400> 15
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 gaaccgtgcg tgcgtggc tgcggcgccgg tggtggcgcc ctcgcgcggc cagtgccgcg 120
 tgccgcgcg ggtgtgcg cccgcggaga cggcgcggc gacgcggcgc cgctgtacgc 180
 actcgatgcc gcccggaaag gcgagggtgt tccggctcgct ggaagggtgg gcgagggtcg 240
 cgctgtgcc gctgtcaag cccgtggagg agtgcgtggca gccgacgcac ttcctgcccgg 300
 actcgatgtc ggatgttc gaggcaccagg tccacgagct cccgcgcgc gcccggggc 360
 tccccgacga gtacttcgtc gtgtgtcg gggacatgtat taccgaggag ggcgtgcccga 420
 cgtaccagac catgtcaac acgctcgacg gctccgcga cgagaccgc gccagcgcct 480
 gccccctggc cgtctggacg cgcacctgga cccgcggaga gaaccgcac ggcgacatcc 540
 tcggcaagta catgtacctc tccggccgcg tcgacatgcg catggtcgag aagaccgtcc 600
 agtacacctat cggctccggc atggatccgg ggacggagaa caaccgcac ctgggttcg 660
 tgtacaccag cttccaggag cgcgcgacgg ccgtgtcgca cggaaacacg ggcgcgcctcg 720
 ccaggcgcga cggggacgac gtcctggcgc gcacctgcgg caccatgcgc gccgacgaga 780
 agcggcaca gacggcgtac gggcgcacgt tggagcagct gctgcggcgc gaccggacg 840
 ggcgcacgtcg cgcacatcgac gacatgtgc acaacgcggat caccatgcgc ggcgcacatcc 900
 tgcacgacgg cgcgcacatg aacctgttcg accacattcgc cgcgcgtgcg cagcgcgcctcg 960
 acgtctcacac cgcgcgcgcac tacggcaca tcgtcgagtt cctcgtaag cgggtggaaagc 1020
 tggagacacct ggagactggg ctctccggcg aggccggag ggcgcggac ttctgtgcg 1080
 ggctcgccaa gaggatgcgg cggccgcgg agcgggctga ggacagggt aagaaggatg 1140
 agcagagggaa ggtcaagttc agtggatct atgataggga agtgattgtc tagtttaact 1200

tgtcttggtt gaattctgaa ttcccagtcc tagatgtatca tgccatttcg ttatcatctc 1260
tggtcttgc ttctcttgc aatgcagtaaa attggtataaaa aaaaaaaaaa 1318

<210> 16
<211> 381
<212> PRT
<213> Oryza sativa

<400> 16
Met Gln Val Val Gly Thr Val Arg Val Ser Gly Cys Gly Ala Val Val
1 5 10 15

Ala Pro Ser Arg Arg Gln Cys Arg Val Ser Ala Ala Val Leu Thr Ala
20 25 30

Ala Glu Thr Ala Thr Ala Thr Arg Arg Arg Val Thr His Ser Met Pro
35 40 45

Pro Glu Lys Ala Glu Val Phe Arg Ser Leu Glu Gly Trp Ala Arg Ser
50 55 60

Ser Leu Leu Pro Leu Leu Lys Pro Val Glu Glu Cys Trp Gln Pro Thr
65 70 75 80

Asp Phe Leu Pro Asp Ser Ser Ser Glu Met Phe Glu His Gln Val His
85 90 95

Glu Leu Arg Ala Arg Ala Ala Gly Leu Pro Asp Glu Tyr Phe Val Val
100 105 110

Leu Val Gly Asp Met Ile Thr Glu Glu Ala Leu Pro Thr Tyr Gln Thr
115 120 125

Met Ile Asn Thr Leu Asp Gly Val Arg Asp Glu Thr Gly Ala Ser Ala
130 135 140

Cys Pro Trp Ala Val Trp Thr Arg Thr Trp Thr Ala Glu Glu Asn Arg
145 150 155 160

His Gly Asp Ile Leu Gly Lys Tyr Met Tyr Leu Ser Gly Arg Val Asp
165 170 175

Met Arg Met Val Glu Lys Thr Val Gln Tyr Leu Ile Gly Ser Gly Met
180 185 190

Asp Pro Gly Thr Glu Asn Asn Pro Tyr Leu Gly Phe Val Tyr Thr Ser
195 200 205

Phe Gln Glu Arg Ala Thr Ala Val Ser His Gly Asn Thr Ala Arg Leu
210 215 220

Ala Arg Ala His Gly Asp Asp Val Leu Ala Arg Thr Cys Gly Thr Ile
225 230 235 240

Ala Ala Asp Glu Lys Arg His Glu Thr Ala Tyr Gly Arg Ile Val Glu
245 250 255

Gln Leu Leu Arg Leu Asp Pro Asp Gly Ala Met Leu Ala Ile Ala Asp
260 265 270

Met	Met	His	Lys	Arg	Ile	Thr	Met	Pro	Ala	His	Leu	Met	His	Asp	Gly
275							280					285			
Arg	Asp	Met	Asn	Leu	Phe	Asp	His	Phe	Ala	Ala	Val	Ala	Gln	Arg	Leu
290						295					300				
Asn	Val	Tyr	Thr	Ala	Arg	Asp	Tyr	Ala	Asp	Ile	Val	Glu	Phe	Leu	Val
305					310				315			320			
Lys	Arg	Trp	Lys	Leu	Glu	Thr	Leu	Glu	Thr	Gly	Leu	Ser	Gly	Glu	Gly
					325			330			335				
Arg	Arg	Ala	Arg	Asp	Phe	Val	Cys	Gly	Leu	Ala	Lys	Arg	Met	Arg	Arg
						340		345			350				
Ala	Ala	Glu	Arg	Ala	Glu	Asp	Arg	Ala	Lys	Lys	Asp	Glu	Gln	Arg	Lys
		355				360					365				
Val	Lys	Phe	Ser	Trp	Ile	Tyr	Asp	Arg	Glu	Val	Ile	Val			
					370		375				380				
<210> 17															
<211> 384															
<212> PRT															
<213> Lupinus luteus															
<400> 17															
Met	Gln	Ile	Gln	Thr	Cys	Tyr	Ser	Ile	Arg	Ile	Gln	Ile	Leu	Pro	Leu
1					5				10					15	
Pro	Trp	Ala	Arg	Arg	Thr	Gly	Arg	His	Lys	Met	Leu	Pro	Pro	Ile	Ala
					20				25			30			
Ala	Ile	Ser	Ala	Thr	Pro	Pro	Ser	Leu	Lys	Ser	Pro	Lys	Thr	His	Ser
					35			40				45			
Met	Pro	Pro	Glu	Lys	Ile	Glu	Ile	Phe	Lys	Ser	Leu	Glu	Ser	Trp	Ala
					50		55				60				
Ser	Gln	Ser	Val	Leu	Pro	Leu	Leu	Lys	Pro	Val	Glu	Gln	Cys	Trp	Gln
					65		70			75			80		
Pro	Gln	Glu	Phe	Val	Pro	Asp	Ser	Ser	Leu	Pro	Phe	Gly	Asp	Phe	Thr
					85				90			95			
Asp	Gln	Val	Lys	Ala	Leu	Arg	Asp	Arg	Thr	Ala	Glu	Leu	Pro	Glu	Glu
					100			105				110			
Tyr	Phe	Val	Val	Leu	Val	Gly	Asp	Met	Ile	Thr	Glu	Asp	Ala	Leu	Pro
					115			120			125				
Thr	Tyr	Gln	Ser	Met	Ile	Asn	Asn	Leu	Asp	Gly	Val	Arg	Asp	Glu	Thr
					130			135			140				
Gly	Ser	Ser	Pro	Ser	Pro	Trp	Ala	Leu	Trp	Thr	Arg	Ala	Trp	Thr	Ala
					145		150			155			160		

Glu Glu Lys Arg His Gly Asp Leu Leu Arg Thr Tyr Leu Tyr Leu Ser
 165 170 175
 Gly Arg Val Asp Met Lys Lys Ile Glu Lys Thr Val Gln Tyr Leu Ile
 180 185 190
 Gly Ser Gly Met Asp Pro Gly Thr Glu Asn Asn Pro Tyr Leu Gly Phe
 195 200 205
 Val Tyr Thr Ser Phe Gln Glu Arg Ala Thr Phe Val Ser His Gly Asn
 210 215 220
 Thr Ala Arg Leu Ala Lys Glu Gly Gly Asp Pro Val Leu Ala Arg Ile
 225 230 235 240
 Cys Gly Thr Ile Ala Ala Asp Glu Lys Arg His Glu Asn Ala Tyr Ser
 245 250 255
 Arg Ile Val Glu Lys Leu Leu Glu Leu Asp Pro Thr Gly Ala Met Val
 260 265 270
 Ala Ile Gly Asp Met Met Gln Lys Lys Ile Thr Met Pro Ala His Leu
 275 280 285
 Met Tyr Asp Gly Glu Asp Pro Lys Leu Phe Asp His Phe Ser Ala Val
 290 295 300
 Ala Gln Arg Met Gly Val Tyr Thr Ala Asn Asp Tyr Ala Asp Ile Leu
 305 310 315 320
 Glu Phe Leu Ile Gly Arg Trp Arg Leu Glu Lys Val Gln Asp Leu Lys
 325 330 335
 Asp Glu Gly Lys Lys Ala Gln Asp Phe Val Cys Gly Leu Ala Pro Arg
 340 345 350
 Ile Arg Arg Leu Gln Glu Arg Ala Asp Glu Arg Ala Arg Lys Met Lys
 355 360 365
 Pro His Ala Val Lys Phe Ser Trp Ile Phe Asn Lys Glu Ile Ile Leu
 370 375 380

<210> 18
 <211> 396
 <212> PRT
 <213> Cucumis sativus

<400> 18
 Met Ala Leu Lys Phe His Pro Leu Thr Ser Gln Ser Pro Lys Leu Pro
 1 5 10 15
 Ser Phe Arg Met Pro Gln Leu Ala Ser Leu Arg Ser Pro Lys Phe Val
 20 25 30
 Met Ala Ser Thr Leu Arg Ser Thr Ser Arg Glu Val Glu Thr Leu Lys
 35 40 45
 Lys Pro Phe Met Pro Pro Arg Glu Val His Leu Gln Val Thr His Ser
 50 55 60

Met	Pro	Pro	Gln	Lys	Met	Glu	Ile	Phe	Lys	Ser	Leu	Glu	Asp	Trp	Ala
65					70				75					80	
Glu	Glu	Asn	Leu	Leu	Val	His	Leu	Lys	Pro	Val	Glu	Arg	Cys	Trp	Gln
					85				90					95	
Pro	Gln	Asp	Phe	Leu	Pro	Asp	Ser	Ala	Phe	Glu	Gly	Phe	His	Glu	Gln
					100				105				110		
Val	Arg	Glu	Leu	Arg	Glu	Arg	Ala	Lys	Glu	Leu	Pro	Asp	Glu	Tyr	Phe
					115				120				125		
Val	Val	Leu	Val	Gly	Asp	Met	Ile	Thr	Glu	Glu	Ala	Leu	Pro	Thr	Tyr
					130				135				140		
Gln	Thr	Met	Leu	Asn	Thr	Leu	Asp	Gly	Val	Arg	Asp	Glu	Thr	Gly	Ala
					145				150				155		160
Ser	Pro	Thr	Pro	Trp	Ala	Ile	Trp	Thr	Arg	Ala	Trp	Thr	Ala	Glu	Glu
					165				170				175		
Asn	Arg	His	Gly	Asp	Leu	Leu	Asn	Lys	Tyr	Leu	Tyr	Leu	Ser	Gly	Arg
					180				185				190		
Val	Asp	Met	Arg	Gln	Val	Glu	Lys	Thr	Ile	Gln	Tyr	Leu	Ile	Gly	Ser
					195				200				205		
Gly	Met	Asp	Pro	Arg	Thr	Glu	Asn	Asn	Pro	Tyr	Leu	Gly	Phe	Ile	Tyr
					210				215				220		
Thr	Ser	Phe	Gln	Glu	Arg	Ala	Thr	Phe	Ile	Ser	His	Gly	Asn	Thr	Ala
					225				230				235		240
Arg	Leu	Ala	Lys	Glu	His	Gly	Asp	Ile	Lys	Leu	Ala	Gln	Ile	Cys	Gly
					245				250				255		
Thr	Ile	Thr	Ala	Asp	Glu	Lys	Arg	His	Glu	Thr	Ala	Tyr	Thr	Lys	Ile
					260				265				270		
Val	Glu	Lys	Leu	Phe	Glu	Ile	Asp	Pro	Glu	Gly	Thr	Val	Ile	Ala	Phe
					275				280				285		
Glu	Glu	Met	Met	Arg	Lys	Lys	Val	Ser	Met	Pro	Ala	His	Leu	Met	Tyr
					290				295				300		
Asp	Gly	Arg	Asp	Asp	Asn	Leu	Phe	His	His	Phe	Ser	Ala	Val	Ala	Gln
					305				310				315		320
Arg	Leu	Gly	Val	Tyr	Thr	Ala	Lys	Asp	Tyr	Ala	Asp	Ile	Leu	Glu	Phe
					325				330				335		
Leu	Val	Gly	Arg	Trp	Lys	Val	Glu	Ser	Leu	Thr	Gly	Leu	Ser	Gly	Glu
					340				345				350		
Gly	Gln	Lys	Ala	Gln	Asp	Tyr	Val	Cys	Ala	Leu	Pro	Ala	Arg	Ile	Arg
					355				360				365		
Lys	Leu	Glu	Glu	Arg	Ala	Gln	Gly	Arg	Ala	Lys	Glu	Gly	Pro	Thr	Ile
					370				375				380		

Pro Phe Ser Trp Ile Phe Asp Arg Gln Val Lys Leu
 385 390 395

 <210> 19
 <211> 374
 <212> PRT
 <213> Arabidopsis thaliana

 <400> 19
 Met Pro Ser Pro Ser Thr Phe Leu Ala Ser Arg Pro Arg Gly Pro Ala
 1 5 10 15

 Lys Ile Ser Ala Val Ala Ala Pro Val Arg Pro Ala Leu Lys His Gln
 20 25 30

 Asn Lys Ile His Thr Met Pro Pro Glu Lys Met Glu Ile Phe Lys Ser
 35 40 45

 Leu Asp Gly Trp Ala Lys Asp Gln Ile Leu Pro Leu Leu Lys Pro Val
 50 55 60

 Asp Gln Cys Trp Gln Pro Ala Ser Phe Leu Pro Asp Pro Ala Leu Pro
 65 70 75 80

 Phe Ser Glu Phe Thr Asp Gln Val Arg Glu Leu Arg Glu Arg Thr Ala
 85 90 95

 Ser Leu Pro Asp Glu Tyr Phe Val Val Leu Val Gly Asp Met Ile Thr
 100 105 110

 Glu Asp Ala Leu Pro Thr Tyr Gln Thr Met Ile Asn Thr Leu Asp Gly
 115 120 125

 Val Arg Asp Glu Thr Gly Ala Ser Glu Ser Ala Trp Ala Ser Trp Thr
 130 135 140

 Arg Ala Trp Thr Ala Glu Glu Asn Arg His Gly Asp Leu Leu Arg Thr
 145 150 155 160

 Tyr Leu Tyr Leu Ser Gly Arg Val Asp Met Leu Met Val Glu Arg Thr
 165 170 175

 Val Gln His Leu Ile Gly Ser Gly Met Asp Pro Gly Thr Glu Asn Asn
 180 185 190

 Pro Tyr Leu Gly Phe Val Tyr Thr Ser Phe Gln Glu Arg Ala Thr Phe
 195 200 205

 Val Ser His Gly Asn Thr Ala Arg Leu Ala Lys Ser Ala Gly Asp Pro
 210 215 220

 Val Leu Ala Arg Ile Cys Gly Thr Ile Ala Ala Asp Glu Lys Arg His
 225 230 235 240

 Glu Asn Ala Tyr Val Arg Ile Val Glu Lys Leu Leu Glu Ile Asp Pro
 245 250 255

Asn Gly Ala Val Ser Ala Val Ala Asp Met Met Arg Lys Lys Ile Thr
260 265 270

Met Pro Ala His Leu Met Thr Asp Gly Arg Asp Pro Met Leu Phe Glu
275 280 285

His Phe Ser Ala Val Ala Gln Arg Leu Glu Val Tyr Thr Ala Asp Asp
290 295 300

Tyr Ala Asp Ile Leu Glu Phe Leu Val Gly Arg Trp Arg Leu Glu Lys
305 310 315 320

Leu Glu Gly Leu Thr Gly Glu Gly Gln Arg Ala Gln Glu Phe Val Cys
325 330 335

Gly Leu Ala Gln Arg Ile Arg Arg Leu Gln Glu Arg Ala Asp Glu Arg
340 345 350

Ala Lys Lys Leu Lys Lys Thr His Glu Val Cys Phe Ser Trp Ile Phe
355 360 365

Asp Lys Gln Ile Ser Val
370

<210> 20

<211> 398

<212> PRT

<213> Simmondsia chinensis

<400> 20

Met Ala Leu Lys Leu His His Thr Ala Phe Asn Pro Ser Met Ala Val
1 5 10 15

Thr Ser Ser Gly Leu Pro Arg Ser Tyr His Leu Arg Ser His Arg Val
20 25 30

Phe Met Ala Ser Ser Thr Ile Gly Ile Thr Ser Lys Glu Ile Pro Asn
35 40 45

Ala Lys Lys Pro His Met Pro Pro Arg Glu Ala His Val Gln Lys Thr
50 55 60

His Ser Met Pro Pro Gln Lys Ile Glu Ile Phe Lys Ser Leu Glu Gly
65 70 75 80

Trp Ala Glu Glu Asn Val Leu Val His Leu Lys Pro Val Glu Lys Cys
85 90 95

Trp Gln Pro Gln Asp Phe Leu Pro Asp Pro Ala Ser Glu Gly Phe Met
100 105 110

Asp Gln Val Lys Glu Leu Arg Glu Arg Thr Lys Glu Ile Pro Asp Glu
115 120 125

Tyr Leu Val Val Leu Val Gly Asp Met Ile Thr Glu Glu Ala Leu Pro
130 135 140

Thr Tyr Gln Thr Met Leu Asn Thr Leu Asp Gly Val Arg Asp Glu Thr
145 150 155 160

Gly Ala Ser Leu Thr Ser Trp Ala Ile Trp Thr Arg Ala Trp Thr Ala
 165 170 175
 Glu Glu Asn Arg His Gly Asp Leu Leu Asn Lys Tyr Leu Tyr Leu Thr
 180 185 190
 Gly Arg Val Asp Met Lys Gln Ile Glu Lys Thr Ile Gln Tyr Leu Ile
 195 200 205
 Gly Ser Gly Met Asp Pro Arg Ser Glu Asn Asn Pro Tyr Leu Gly Phe
 210 215 220
 Ile Tyr Thr Ser Phe Gln Glu Arg Ala Thr Phe Ile Ser His Gly Asn
 225 230 235 240
 Thr Ala Arg Leu Ala Lys Asp His Gly Asp Phe Gln Leu Ala Gln Val
 245 250 255
 Cys Gly Ile Ile Ala Ala Asp Glu Lys Arg His Glu Thr Ala Tyr Thr
 260 265 270
 Lys Ile Val Glu Lys Leu Phe Glu Ile Asp Pro Asp Gly Ala Val Leu
 275 280 285
 Ala Leu Ala Asp Met Met Arg Lys Lys Val Ser Met Pro Ala His Leu
 290 295 300
 Met Tyr Asp Gly Lys Asp Asp Asn Leu Phe Glu Asn Tyr Ser Ala Val
 305 310 315 320
 Ala Gln Gln Ile Gly Val Tyr Thr Ala Lys Asp Tyr Ala Asp Ile Leu
 325 330 335
 Glu His Leu Val Asn Arg Trp Lys Val Glu Asn Leu Met Gly Leu Ser
 340 345 350
 Gly Glu Gly His Lys Ala Gln Asp Phe Val Cys Gly Leu Ala Pro Arg
 355 360 365
 Ile Arg Lys Leu Gly Glu Arg Ala Gln Ser Leu Ser Lys Pro Val Ser
 370 375 380
 Leu Val Pro Phe Ser Trp Ile Phe Asn Lys Glu Leu Lys Val
 385 390 395

<210> 21
 <211> 411
 <212> PRT
 <213> Arabidopsis thaliana

<400> 21
 Met Ala Leu Leu Leu Asn Ser Thr Ile Thr Val Ala Met Lys Gln Asn
 1 5 10 15
 Pro Leu Val Ala Val Ser Phe Pro Arg Thr Thr Cys Leu Gly Ser Ser
 20 25 30

Phe	Ser	Pro	Pro	Arg	Leu	Leu	Arg	Val	Ser	Cys	Val	Ala	Thr	Asn	Pro
35							40							45	
Ser	Lys	Thr	Ser	Glu	Glu	Thr	Asp	Lys	Lys	Phe	Arg	Pro	Ile	Lys	
50						55				60					
Glu	Val	Pro	Asn	Gln	Val	Thr	His	Thr	Ile	Thr	Gln	Glu	Lys	Leu	Glu
65					70					75				80	
Ile	Phe	Lys	Ser	Met	Glu	Asn	Trp	Ala	Gln	Glu	Asn	Leu	Leu	Ser	Tyr
				85					90					95	
Leu	Lys	Pro	Val	Glu	Ala	Ser	Trp	Gln	Pro	Gln	Asp	Phe	Leu	Pro	Glu
			100					105					110		
Thr	Asn	Asp	Glu	Asp	Arg	Phe	Tyr	Glu	Gln	Val	Lys	Glu	Leu	Arg	Asp
			115				120				125				
Arg	Thr	Lys	Glu	Ile	Pro	Asp	Asp	Tyr	Phe	Val	Val	Leu	Val	Gly	Asp
			130			135				140					
Met	Ile	Thr	Glu	Glu	Ala	Leu	Pro	Thr	Tyr	Gln	Thr	Thr	Leu	Asn	Thr
145					150					155			160		
Leu	Asp	Gly	Val	Lys	Asp	Glu	Thr	Gly	Gly	Ser	Leu	Thr	Pro	Trp	Ala
			165					170				175			
Val	Trp	Val	Arg	Ala	Trp	Thr	Ala	Glu	Glu	Asn	Arg	His	Gly	Asp	Leu
			180				185				190				
Leu	Asn	Lys	Tyr	Leu	Tyr	Leu	Ser	Gly	Arg	Val	Asp	Met	Arg	His	Val
			195				200				205				
Glu	Lys	Thr	Ile	Gln	Tyr	Leu	Ile	Gly	Ser	Gly	Met	Asp	Ser	Lys	Phe
			210			215				220					
Glu	Asn	Asn	Pro	Tyr	Asn	Gly	Phe	Ile	Tyr	Thr	Ser	Phe	Gln	Glu	Arg
225					230				235				240		
Ala	Thr	Phe	Ile	Ser	His	Gly	Asn	Thr	Ala	Lys	Leu	Ala	Thr	Thr	Tyr
				245				250				255			
Gly	Asp	Thr	Thr	Leu	Ala	Lys	Ile	Cys	Gly	Thr	Ile	Ala	Ala	Asp	Glu
				260				265				270			
Lys	Arg	His	Glu	Thr	Ala	Tyr	Thr	Arg	Ile	Val	Glu	Lys	Leu	Phe	Glu
				275				280				285			
Ile	Asp	Pro	Asp	Gly	Thr	Val	Gln	Ala	Leu	Ala	Ser	Met	Met	Arg	Lys
					290		295				300				
Arg	Ile	Thr	Met	Pro	Ala	His	Leu	Met	His	Asp	Gly	Arg	Asp	Asp	Asp
305						310			315				320		
Leu	Phe	Asp	His	Tyr	Ala	Ala	Val	Ala	Gln	Arg	Ile	Gly	Val	Tyr	Thr
					325			330				335			
Ala	Thr	Asp	Tyr	Ala	Gly	Ile	Leu	Glu	Phe	Leu	Leu	Arg	Arg	Trp	Glu
					340			345				350			

Val Glu Lys Leu Gly Met Gly Leu Ser Gly Glu Gly Arg Arg Ala Gln
355 360 365

Asp Tyr Leu Cys Thr Leu Pro Gln Arg Ile Arg Arg Leu Glu Glu Arg
370 375 380

Ala Asn Asp Arg Val Lys Leu Ala Ser Lys Ser Lys Pro Ser Val Ser
385 390 395 400

Phe Ser Trp Ile Tyr Gly Arg Glu Val Glu Leu
405 410

<210> 22

<211> 396

<212> PRT

<213> Linum usitatissimum

<400> 22

Met Ala Leu Lys Leu Asn Pro Val Thr Thr Phe Pro Ser Thr Arg Ser
1 5 10 15

Leu Asn Asn Phe Ser Ser Arg Ser Pro Arg Thr Phe Leu Met Ala Ala
20 25 30

Ser Thr Phe Asn Ser Thr Ser Thr Lys Glu Ala Glu Lys Leu Lys Lys
35 40 45

Ser His Gly Pro Pro Lys Glu Val His Met Gln Val Thr His Ser Met
50 55 60

Pro Pro Gln Lys Leu Glu Ile Phe Lys Ser Leu Glu Gly Trp Ala Glu
65 70 75 80

Asp Val Leu Leu Pro His Leu Lys Pro Val Glu Lys Cys Trp Gln Pro
85 90 95

Gln Asp Phe Leu Pro Glu Pro Glu Ser Asp Gly Phe Glu Glu Gln Val
100 105 110

Lys Glu Leu Arg Ala Arg Ala Lys Glu Leu Pro Asp Asp Tyr Phe Val
115 120 125

Val Leu Val Gly Asp Met Ile Thr Glu Glu Ala Leu Pro Thr Tyr Gln
130 135 140

Thr Met Leu Asn Thr Leu Asp Gly Val Arg Asp Glu Thr Gly Ala Ser
145 150 155 160

Leu Thr Pro Trp Ala Ile Trp Thr Arg Ala Trp Thr Ala Glu Glu Asn
165 170 175

Arg His Gly Asp Leu Leu Asn Lys Tyr Leu Tyr Leu Ser Gly Arg Val
180 185 190

Asp Met Arg Gln Ile Glu Lys Thr Ile Gln Tyr Leu Ile Gly Ser Gly
195 200 205

Met Asp Pro Lys Thr Glu Asn Asn Pro Tyr Leu Gly Phe Ile Tyr Thr
210 215 220

Ser Phe Gln Glu Arg Ala Thr Phe Ile Ser His Gly Asn Thr Ala Arg
 225 230 235 240

 Leu Ala Lys Asp His Gly Asp Met Lys Leu Ala Gln Ile Cys Gly Ile
 245 250 255

 Ile Ala Ala Asp Glu Lys Arg His Glu Thr Ala Tyr Thr Lys Ile Val
 260 265 270

 Glu Lys Leu Phe Glu Ile Asp Pro Asp Gly Thr Val Leu Ala Leu Ala
 275 280 285

 Asp Met Met Arg Lys Lys Ile Ser Met Pro Ala His Leu Met Tyr Asp
 290 295 300

 Gly Glu Asp Asp Asn Leu Phe Asp Asn Tyr Ser Ser Val Ala Gln Arg
 305 310 315 320

 Ile Gly Val Tyr Thr Ala Lys Asp Tyr Ala Asp Ile Leu Glu Phe Leu
 325 330 335

 Val Gly Arg Trp Lys Val Asp Ala Phe Thr Gly Leu Ser Gly Glu Gly
 340 345 350

 Asn Lys Ala Gln Asp Phe Val Cys Gly Leu Pro Ala Arg Ile Arg Lys
 355 360 365

 Leu Glu Glu Arg Ala Ala Gly Arg Ala Lys Gln Thr Ser Lys Ser Val
 370 375 380

 Pro Phe Ser Trp Ile Phe Ser Arg Glu Leu Val Leu
 385 390 395

<210> 23
<211> 391
<212> PRT
<213> Glycine max

<400> 23
Met ala Leu Arg Leu Asn Pro Ile Pro Thr Gln Thr Phe Ser Leu Pro
1 5 10 15

Gln Met Pro Ser Leu Arg Ser Pro Arg Phe Arg Met ala Ser Thr Leu
20 25 30

Arg Ser Gly Ser Lys Glu Val Glu Asn Ile Lys Lys Pro Phe Thr Pro
35 40 45

Pro Arg Glu Val His Val Gln Val Thr His Ser Met Pro Pro Gln Lys
50 55 60

Ile Glu Ile Phe Lys Ser Leu Glu Asp Trp Ala Asp Gln Asn Ile Leu
65 70 75 80

Thr His Leu Lys Pro Val Glu Lys Cys Trp Gln Pro Gln Asp Phe Leu
85 90 95

Pro	Asp	Pro	Ser	Ser	Asp	Gly	Phe	Glu	Glu	Gln	Val	Lys	Glu	Leu	Arg
								100					110		
Glu	Arg	Ala	Lys	Glu	Ile	Pro	Asp	Asp	Tyr	Phe	Val	Val	Leu	Val	Gly
								115		120			125		
Asp	Met	Ile	Thr	Glu	Glu	Ala	Leu	Pro	Thr	Tyr	Gln	Thr	Met	Leu	Asn
								130		135			140		
Thr	Leu	Asp	Gly	Val	Arg	Asp	Glu	Thr	Gly	Ala	Ser	Leu	Thr	Ser	Trp
								145		150			155		160
Ala	Ile	Trp	Thr	Arg	Ala	Trp	Thr	Ala	Glu	Glu	Asn	Arg	His	Gly	Asp
								165		170			175		
Leu	Leu	Asn	Lys	Tyr	Leu	Tyr	Leu	Ser	Gly	Arg	Val	Asp	Met	Lys	Gln
								180		185			190		
Ile	Glu	Lys	Thr	Ile	Gln	Tyr	Leu	Ile	Gly	Ser	Gly	Met	Asp	Pro	Arg
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<211> 80

<212> DNA
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 region of pKS133

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